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Last Name = REPIN First Name = DMITRIY

Application#	Patent#	Status	Date Filed	Title	Inventor Name
10017560	Not Issued	071		METHOD AND APPARATUS FOR VISUALIZATION OF 3D VOXEL DATA USING LIT OPACITY VOLUMES WITH SHADING	REPIN, DMITRIY G.
60256433	Not Issued	159	12/18/2000	VISUALIZATION OF 3D GEOSCIENCE DATA USING LIT OPACITY VOLUMES WITH SHADING	REPIN, DMITRIY G.

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Application#	Patent#	Status	Date Filed	Title	Inventor Name
10017560	Not Issued	071		METHOD AND APPARATUS FOR VISUALIZATION OF 3D VOXEL DATA USING LIT OPACITY VOLUMES WITH SHADING	PASSOLT, MARK S.
60256433	Not Issued	159		VISUALIZATION OF 3D GEOSCIENCE DATA USING LIT OPACITY VOLUMES WITH SHADING	PASSOLT, MARK S.

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Three-dimensional medical imaging: algorithms and computer systems

M. R. Stytz, G. Frieder, O. Frieder

December 1991 ACM Computing Surveys (CSUR), Volume 23 Issue 4

Full text available: pdf(7.38 MB)

Additional Information: full citation, references, citings, index terms, review

Keywords: Computer graphics, medical imaging, surface rendering, three-dimensional imaging, volume rendering

Volume rendering

Robert A. Drebin, Loren Carpenter, Pat Hanrahan

June 1988 ACM SIGGRAPH Computer Graphics, Proceedings of the 15th annual conference on Computer graphics and interactive techniques, Volume 22 Issue 4

Full text available: pdf(4.94 MB)

Additional Information: full citation, abstract, references, citings, index terms

A technique for rendering images of volumes containing mixtures of materials is presented. The shading model allows both the interior of a material and the boundary between materials to be colored. Image projection is performed by simulating the absorption of light along the ray path to the eye. The algorithms used are designed to avoid artifacts caused by aliasing and quantization and can be efficiently implemented on an image computer. Images from a variety of applications are shown.

Keywords: computer tomography, image processing, magnetic resonance imaging (MRI), medical imaging, non-destructive evaluation (NDE), scientific visualization

3 Volume seedlings

Michael F. Cohen, James Painter, Mihir Mehta, Kwan-Liu Ma June 1992 Proceedings of the 1992 symposium on Interactive 3D graphics

Full text available: pdf(1.73 MB)

Additional Information: full citation, references, citings, index terms

Efficient ray tracing of volume data

Marc Levoy

July 1990 ACM Transactions on Graphics (TOG), Volume 9 Issue 3

Full text available: pdf(3.30 MB)

Additional Information: full citation, abstract, references, citings, index terms, review

Volume rendering is a technique for visualizing sampled scalar or vector fields of three spatial dimensions without fitting geometric primitives to the data. A subset of these techniques generates images by computing 2-D projections of a colored semitransparent volume, where the color and opacity at each point are derived from the data using local operators. Since all voxels participate in the generation of each image, rendering time grows linearly with the size of the data ...

⁵ Hardware: Hardware-accelerated parallel non-photorealistic volume rendering Eric B. Lum, Kwan-Liu Ma



Full text available: pdf(12.03 MB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u>

Non-photorealistic rendering can be used to illustrate subtle spatial relationships that might not be visible with more realistic rendering techniques. We present a parallel hardwareaccelerated rendering technique, making extensive use of multi-texturing and paletted textures, for the interactive non-photorealistic visualization of scalar volume data. With this technique, we can render a 512x512x512 volume using non-photorealistic techniques that include tone-shading, silhouettes, gradient-base ...

Keywords: interactive visualization, non-photorealistic rendering, parallel rendering, scientific visualization, silhouette, texture graphics hardware, visual perception, volume rendering

Integrated visualization of brain anatomy and cerebral blood vessels Dirk Vandermeulen, Peter Plets, Steven Ramkers, Paul Suetens, Guy Marchal December 1992 Proceedings of the 1992 workshop on Volume visualization

Full text available: pdf(1.02 MB)

Additional Information: full citation, references, index terms

7 Extracting surfaces from fuzzy 3D-ultrasound data

Georgios Sakas, Stefan Walter

September 1995 Proceedings of the 22nd annual conference on Computer graphics and interactive techniques

Full text available: pdf(867.39 KB) **事 ps(9.39 MB)**

Additional Information: <u>full citation</u>, <u>references</u>, <u>citings</u>, <u>index terms</u>

Keywords: 3D ultrasound, morphology, multiresolution analysis, volume rendering

Image-based 3D photography using opacity hulls

Wojciech Matusik, Hanspeter Pfister, Addy Ngan, Paul Beardsley, Remo Ziegler, Leonard McMillan

July 2002 ACM Transactions on Graphics (TOG), Proceedings of the 29th annual conference on Computer graphics and interactive techniques, Volume 21 Issue 3

Full text available: pdf(27.14 MB)

Additional Information: full citation, abstract, references, citings, index

terms

We have built a system for acquiring and displaying high quality graphical models of objects that are impossible to scan with traditional scanners. Our system can acquire highly specular and fuzzy materials, such as fur and feathers. The hardware set-up consists of a turntable, two plasma displays, an array of cameras, and a rotating array of directional lights. We use multi-background matting techniques to acquire alpha mattes of the object from multiple viewpoints. The alpha mattes are used to ...

Keywords: 3D photography, image-based rendering

9 Capture from images: Volumetric reconstruction and interactive rendering of trees from photographs

Alex Reche-Martinez, Ignacio Martin, George Drettakis
August 2004 ACM Transactions on Graphics (TOG), Volume 23 Issue 3

Full text available: pdf(423.59 KB) Additional Information: full citation, abstract, references, index terms

Reconstructing and rendering trees is a challenging problem due to the geometric complexity involved, and the inherent difficulties of capture. In this paper we propose a volumetric approach to capture and render trees with relatively sparse foliage. Photographs of such trees typically have single pixels containing the blended projection of numerous leaves/branches and background. We show how we estimate opacity values on a recursive grid, based on alphamattes extracted from a small number of ca ...

Keywords: 3D reconstruction, interactive rendering, visibility estimation

10 3D texture: Shell texture functions

Yanyun Chen, Xin Tong, Jiaping Wang, Stephen Lin, Baining Guo, Heung-Yeung Shum August 2004 **ACM Transactions on Graphics (TOG)**, Volume 23 Issue 3

Full text available: Topdf(1.40 MB)

Additional Information: full citation, abstract, references

We propose a texture function for realistic modeling and efficient rendering of materials that exhibit surface mesostructures, translucency and volumetric texture variations. The appearance of such complex materials for dynamic lighting and viewing directions is expensive to calculate and requires an impractical amount of storage to precompute. To handle this problem, our method models an object as a shell layer, formed by texture synthesis of a volumetric material sample, and a homogeneous inne ...

Keywords: BTF, Texture mapping, mesostructure, reflectance and shading models, subsurface scattering, texture synthesis

11 Opacity-weighted color interpolation, for volume sampling
Craig M. Wittenbrink, Thomas Malzbender, Michael E. Goss
October 1998 Proceedings of the 1998 IEEE symposium on Volume visualization

Full text available: pdf(928.76 KB) Additional Information: full citation, references, citings, index terms

Keywords: compositing, ray tracing, volume rendering

Rendering and animation of gaseous phenomena by combining fast volume and scanline A-buffer techniques



D. S. Ebert, Richard E. Parent

September 1990 ACM SIGGRAPH Computer Graphics, Proceedings of the 17th annual conference on Computer graphics and interactive techniques, Volume 24 Issue 4

Full text available: pdf(8.65 MB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

This paper describes a new technique that efficiently combines volume rendering and scanline a-buffer techniques. This technique is useful for combining all types of volume-rendered objects with scanline rendered objects and is especially useful for rendering scenes containing gaseous phenomena such as clouds, fog, and smoke. The rendering and animation of these phenomena has been a difficult problem in computer graphics. A new algorithm for realistically modeling and animating gaseous phenomena ...

13 Volume rendering: VIZARD II: a reconfigurable interactive volume rendering system M. Meißner, U. Kanus, G. Wetekam, J. Hirche, A. Ehlert, W. Straßer, M. Doggett, P. Forthmann, R. Proksa



September 2002 Proceedings of the ACM SIGGRAPH/EUROGRAPHICS conference on Graphics hardware

Full text available: pdf(767.44 KB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

This paper presents a reconfigurable, hardware accelerated, volume rendering system for high quality perspective ray casting. The volume rendering accelerator performs ray casting by calculating the path of the ray through the volume using a programmable Xilinx Virtex FPGA which provides fast design changes and low cost development. Volume datasets are stored on the card in low profile DIMMs with standard connectors allowing both, large datasets up to 1 GByte with 32 bit per voxel, and easy upgr ...

14 Volume illustration: non-photorealistic rendering of volume models David Ebert, Penny Rheingans

October 2000 Proceedings of the conference on Visualization '00

Full text available: pdf(268.75 KB) Additional Information: full citation, citings, index terms

Keywords: illustration, lighting models, non-photorealistic rendering, shading, visualization, volume rendering

A data distributed, parallel algorithm for ray-traced volume rendering Kwan Liu Ma, James S. Painter, Charles D. Hansen, Michael F. Krogh November 1993 Proceedings of the 1993 symposium on Parallel rendering

Full text available: pdf(2.85 MB)

Additional Information: full citation, references, citings, index terms



Keywords: massively parallel processing, network computing, scientific visualization, volume rendering

16 <u>Session P3: volume visualization I: Interactive translucent volume rendering and procedural modeling</u>

Joe Kniss, Simon Premoze, Charles Hansen, David Ebert
October 2002 Proceedings of the conference on Visualization '02

Full text available: pdf(37.78 MB)

Additional Information: full citation, abstract, references, citings, index

terms

Direct volume rendering is a commonly used technique in visualization applications. Many of these applications require sophisticated shading models to capture subtle lighting effects and characteristics of volumetric data and materials. Many common objects and natural phenomena exhibit visual quality that cannot be captured using simple lighting models or cannot be solved at interactive rates using more sophisticated methods. We present a simple yet effective interactive shading model which capt ...

Keywords: procedural modeling, shading model, volume modeling, volume rendering

17 Multi-resolution multi-field ray tracing: a mathematical overview

C. Gasparakis

October 1999 Proceedings of the conference on Visualization '99: celebrating ten years

Full text available: pdf(211.49 KB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

A rigorous mathematical review of ray tracing is presented. The concept of a generic voxel decoder acting on flexible voxel formats is introduced. The necessity of interpolating opacity weighted colors is proved, using a new definition of the blending process in terms of functional integrals. The continuum limit of the discrete opacity accumulation formula is presented, and its convexity properties are investigated. The issues pertaining to interpolation/classification order are discussed. ...

18 <u>Hardware assisted unstructured volume rendering: Multiresolution view-dependent splat based volume rendering of large irregular data</u>

Jeremy Meredith, Kwan-Liu Ma

October 2001 Proceedings of the IEEE 2001 symposium on parallel and large-data visualization and graphics

Full text available: pdf(4.70 MB)

Additional Information: <u>full citation</u>, <u>abstract</u>, <u>references</u>, <u>citings</u>, <u>index</u> terms

We present techniques for multiresolution approximation and hardware-assisted splat based rendering to achieve interactive volume visualization of large irregular data sets. We examine two methods of generating multiple resolutions of irregular volumetric grids and a data structure supporting the splatting approach for volume rendering. These techniques are implemented in combination with a view-dependent error based resolution selection to maintain accuracy at both low and high zoom levels. In ...

Keywords: Hardware-assisted rendering, irregular-grid data, lighting, multiresolution representation, splatting, volume rendering

19 FastSplats: optimized splatting on rectilinear grids

Jian Huang, Roger Crawfis, Naeem Shareef, Klaus Mueller

October 2000 Proceedings of the conference on Visualization '00

Full text available: pdf(2.44 MB)

Additional Information: full citation, citings, index terms

20 Hardware-accelerated volume and isosurface rendering based on cell-projection Stefan Röttger, Martin Kraus, Thomas Ertl

October 2000 Proceedings of the conference on Visualization '00

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Full text available: pdf(2.31 MB)

Additional Information: full citation, citings, index terms



Keywords: cell projection, compositing, graphics hardware, isosurfaces, texture mapping, unstructured meshes, volume rendering

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